

Claims

1. An apparatus for detecting a position of a drawbar unit of an automatic tool exchange device for clamping a tool, the tool exchange device including the drawbar unit and a spindle unit receiving the drawbar unit for allowing the drawbar unit to easily clamp the tool, the position detecting apparatus for the drawbar unit comprising:

5 a core installed at a rear peripheral portion of the drawbar unit;

10 a coil section wound around an outer peripheral portion of the core and having a hollow cylindrical shape with a predetermined thickness and a predetermined length;

15 an LC oscillator connected to the coil section for generating a frequency signal, which varies depending on an inductance value of the coil section; and

20 a position detecting section connected to the LC oscillator so as to transmit position information of the drawbar unit to a main controller by detecting the position of the drawbar unit based on the frequency signal generated from the LC oscillator.

2. The position detecting apparatus as claimed in claim 1, wherein an extension rod is integrally formed with a rear portion of the drawbar unit, and the core made of magnetic material is installed around an outer peripheral portion of the extension rod.

3. The position detecting apparatus as claimed in claim 1, wherein the position detecting section includes a counter, which repeatedly counts the frequency signal generated from the LC oscillator for every one cycle in every predetermined

period of time, a memory section for storing first count values of frequency signals per predetermined unit time corresponding to three different positions of the drawbar unit, and a microcomputer comparing the first count values 5 stored in the memory section with a second count value of an oscillating signal per predetermined unit time, which is currently transmitted from the counter, thereby detecting a present position of the drawbar unit.

10 4. The position detecting apparatus as claimed in claim 1, wherein the position detecting section includes an F/V converter for converting a frequency signal into a voltage signal, an A/D converter for converting an analog value of the voltage signal into a digital value, a memory section for 15 storing first voltage values corresponding to three positions of the drawbar unit, and a microcomputer for detecting a present position of the drawbar unit by comparing the first voltage values stored in the memory section with a second voltage value applied thereto through the F/V converter.

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5. The position detecting apparatus as claimed in claim 1, wherein the position detecting section includes an F/V converter for converting a frequency signal into a voltage signal, at least two variable resistors for setting several 25 voltage signals in order to compare the voltage signals with a voltage value generated when the drawbar unit is in a predetermined position, a voltage comparator for comparing the voltage values of the variable resistors with a present voltage value applied from the F/V converter, and a 30 discriminator for detecting the position of the drawbar unit based on a result of the comparison.